

VISITORS' WILLINGNESS TO PAY FOR MANGROVE CONSERVATION: CASE BALE MANGROVE ECOTOURISM

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ABSTRACT

This research aims analyze the visitors' willingness to spend their budget for mangrove conservation. The research type is a quantitative approach. The data collection technique used is an in-depth and face-to-face interview. Population in this research is all visitors of Bale Mangrove Ecotourism. By using accidental sampling, a questionnaire was used as a data collection tool with a total of 99 respondents. The study applied the Travel Cost Method (TCM) to measure the willingness to pay for visitors to preserve the mangrove. The result shows that, the visitors are Willing To Pay (WTP) is IDR.11,209,680 (711,74 USD) per 1,000 visit and the average willingness to pay is IDR.8,595 (0,55 USD) per one visit. Based on the results of statistical analysis, total cost of travelling and environmental awareness impact positive significantly to willingness to pay. The other factors, are income, level of education, dependant, and age affect positive insignificantly to Willingness to pay. On the other hand, the distance factor influence negative insignificantly on WTP.

Keywords: Mangrove Conservation, Travel Cost Method, Willingness to Pay

ABSTRAK

Penelitian ini bertujuan untuk menganalisis kesediaan pengunjung dalam mengeluarkan anggarannya untuk konservasi mangrove. Jenis penelitian adalah pendekatan kuantitatif. Teknik pengumpulan data yang digunakan adalah wawancara mendalam dan tatap muka. Populasi dalam penelitian ini adalah seluruh pengunjung Ekowisata Mangrove Bale. Dengan menggunakan Accidental Sampling, kuesioner digunakan sebagai alat pengumpulan data dengan jumlah responden sebanyak 99 orang. Penelitian ini menerapkan Travel Cost Method (TCM) untuk mengukur kesediaan pengunjung membayar untuk melestarikan mangrove. Hasilnya menunjukkan, Willing To Pay (WTP) pengunjung sebesar Rp.11,209,680 (711.74 USD) per 1,000 kunjungan dan rata - rata kesediaan membayar sebesar Rp.8,595 (0.55 USD) per satu kunjungan. Berdasarkan hasil analisis statistik, total biaya perjalanan dan kesadaran lingkungan mempunyai pengaruh positif signifikan terhadap kemauan membayar. Faktor lainnya yaitu pendapatan, tingkat pendidikan, ketergantungan, dan umur berpengaruh positif dan tidak signifikan terhadap Willingness to pay. Sedangkan faktor jarak mempunyai pengaruh negatif yang tidak signifikan terhadap WTP.

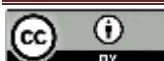
Kata Kunci: Konservasi Mangrove, Metode Biaya Perjalanan, Kesediaan Membayar

INTRODUCTION

Mangrove forest ecosystems worldwide are receiving increased attention from the international community due to their vulnerability and importance to nature. At the 21st meeting of the Conference on Blue Carbon (BC) and Nationally Determined Contributions (NDCs) parties from multiple countries debated through the forum. The meeting was held in December 2015 in Paris, and various countries argued that "mangrove forest ecosystems have important value in mitigation and adaptation, serving as carbon sinks, coastline protectors, and guarantors of future food security." (Herr & Landis, 2016).

Indonesia controls about 23% of the world's total mangrove area. Data from the Ministry of Environment and Forestry in 2021 shows that Indonesia's mangrove forests cover an impressive 3,364,080 hectares. This makes Indonesia the country with the world's largest and most biodiverse mangrove forests (Ministry of Environment and Forestry, 2022).

Mangroves have high economic (Agustriani et al., 2023; Marlianingrum et al., 2021; Utami et al., 2022), coastal communities have utilized mangroves as a valuable natural resource, ranging from raw materials for medicines to fishing equipment (R Djamaluddin, 2018). By visiting the



mangrove area, tourists not only enjoy the beauty of nature but also support environmental conservation efforts and contribute to the local economy (Ibrahim Abdelhalim Ibrahim, 2022; Musa et al., 2020). The potential of mangrove ecotourism has attracted visitors to experience the natural beauty and uniqueness of the mangrove ecosystem. Mangrove ecotourism also contributes to efforts to conserve and preserve mangrove forests (Iqbal & Hossain, 2023; Sari et al., 2023). Mangrove ecosystems have experienced significant degradation due to various anthropogenic pressures (McMullen et al., 2023). Land conversion, illegal exploitation of biological resources, and environmental pollution are some of the main factors that have led to the destruction of these ecosystems (A Hadika & M Karuniasa, 2020).

Although Bale Mangrove Ecotourism has experienced significant degradation due to human activities, this ecosystem still has a vital role in maintaining the resilience of stem. In addition to providing economic benefits to the surrounding community, develop coastal areas to climate change. Mangrove ecosystems face significant threats from climate change, primarily due to rising sea levels, increased frequency and intensity of storms, altered precipitation patterns, and rising temperatures (Friess et al., 2022; Wang et al., 2022). Bale Mangrove Ecotourism restoration efforts will not only restore the ecological function of this forest, they will also provide economic benefits to the surrounding community through the development of mangrove-based ecotourism (Iqbal & Hossain, 2023). Uncontrolled utilization of mangrove forest resources, such as overfishing and logging, has threatened the sustainability of mangrove ecosystems and adversely affected the lives of coastal communities in the long term (Rakotomavo et al., 2018).

Jerowaru Village, located in the coastal area of East Lombok, is rich in natural resources, especially mangrove forests. The potential of mangrove ecotourism in this area has attracted the interest of the local community, especially the younger generation. Jerowaru Village youth, through the Pemuda Telong Elong Association (IPT), have successfully initiated mangrove ecotourism as an effort to preserve the mangrove ecosystem in their area. Through educational tourism, it is hoped that the community can better understand the biodiversity and ecological functions of mangrove forests. This study aims to assess the financial capacity of tourists as a source of funding for mangrove conservation efforts. In

addition, this study will also identify factors that influence tourists' willingness to participate in conservation programs based on ecotourism.

Willingness to Pay is often used in measuring the economic value of a place or natural resource, which is like a study conducted by (Noviati Sadikin et al., 2017) which analyzes how willingness to pay on Mount Rinjani, the variables that significantly affect the study are knowledge and income of the visitors, while based on research conducted by (Hasan-Basri et al., 2020) the results showed that respondents who had high trust in the mangrove conservation program, high income, and had fewer household members, were more willing to contribute additional funds to the mangrove conservation project.

Despite many studies on willingness to pay that have been conducted before, no one has researched calculating willingness to pay while measuring the factors that influence the willingness to pay of visitors to the mangrove conservation with different backgrounds.

This study aims to estimate the economic value of Bale Mangrove Ecotourism by applying the Travel Cost Method (TCM). This approach is commonly used in natural resource valuation, particularly to determine the recreational value of an area (Saha & Mukul, 2022). Therefore, the following essential questions are asked from the tourists' point of view because they play a very significant role in the development of mangrove forest ecosystems in Bale Mangrove Ecotourism through provisions in Willingness to Pay (WTP) such as what is the willingness to pay on average, and total tourists for the mangrove forest sustainability scheme? Based on these questions, the study aims to measure the Willingness to Pay (WTP) of tourists to preserve Bale Mangrove Ecotourism.

LITERATURE REVIEW

Economic value is generally understood to be the greatest amount that an individual is prepared to forgo certain goods and services in order to obtain other goods and services. The idea is formally known as a person's willingness to pay for the goods and services that a resource produces. Willingness to pay for products and services that are made using the environment and natural resources. Therefore, by calculating the monetary value of environmental goods and services, the value of products derived from natural and environmental resources can be converted into natural resources, and the environment can be converted into economic



terms (Fauzi Akhmad, 2010).

WTP is an approach that aims to determine the extent to which an individual is capable of paying the expenses associated with environmental improvement in order to obtain an optimal environment (Syakya, 2005). As defined by (Fauzi Akhmad, 2010), WTP represents the maximum monetary value an individual is willing to forfeit to secure an enhancement in natural resources or environmental quality. This concept underscores the idea that an individual is indifferent between the choice of paying for the improvement and opting for alternative expenditures. Consequently, WTP can be interpreted as a quantifiable measure of the perceived benefits associated with such improvements.

The Travel Cost Method (TCM) is a widely employed economic valuation technique that seeks to quantify the economic value of recreational areas and ecosystems. It operates on the premise that the value of a specific site is reflected in the costs borne by visitors in terms of travel time and monetary expenditures. By examining visitation patterns across varying distances and costs, TCM can estimate individuals' willingness to pay for the recreational experiences offered by the site. The Travel Cost Method has 2 techniques for calculating the value of economic benefits. The Zonal Travel Cost Method (ZTCM) and the Individual Travel Cost Method (ITCM) are two distinct methodologies. The primary distinction between these two approaches is the type of data obtained where the Zonal Travel Cost Method (ZTCM) estimation uses data related to the visitor's zone of origin while the Individual Travel Cost Method (ITCM)

estimation uses data related to the visitor's zone of origin, while the Individual Travel Cost Method (ITCM) estimation uses survey data. Method (ITCM) uses survey data from each individual visitor (interview), not based on zone groupings (Lasmana, 2022). This study used ITCM (Individual Travel Cost Method).

RESEARCH METHODS

The research method used is quantitative approaches. This research was conducted in Jerowaru Village, Jerowaru District, East Lombok Regency, West Nusa Tenggara. The population in this study included all visitors to Bale Mangrove Ecotourism. To obtain representative data, researchers randomly sampled 99 visitors through an accidental sampling technique. This technique was chosen because it allows researchers to collect data quickly from respondents who happen to be at the research location at the time of data collection. The data collection technique used is an in-depth interview or face-to-face with each respondent, and a questionnaire is used as a data collection tool. The data obtained from this questionnaire is primary data collected specifically for this study. The data that has been collected for this research will be analyzed using Stata software with multiple linear regression methods.

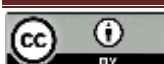
The equation we used to figure out what people are willing to pay for mangrove conservation is expressed as follows:

$$WTP = \alpha_0 + \beta_1 \text{TotalCost Travelling} + \beta_2 \text{Income} + \beta_3 \text{ExpenseForTourism} + \beta_4 \text{Education} + \beta_5 \text{Distance} + \beta_6 \text{Dependant} + \beta_7 \text{Awareness} + \beta_8 \text{Age} + u$$

RESULT AND DISCUSSION

Table 1. Respondent Demography

Variable	Respondent	Total	Percentage
Gender	Male	36	36.4%
	Female	63	63.6%
Education	Bachelor's Degree	13	13.1%
	Senior High School	63	63.6%
	Junior High School	21	21.2%
	Elementary School	2	2.0%
Income (IDR per month)	0-2000000	93	93.9%
	2100000-5000000	4	4.0%
	5100000-7500000	1	1.0%
	7600000-10000000	1	1.0%
Age (Years old)	13-22	76	76.8%
	23-32	14	14.1%
	33-42	4	4.0%
	43-52	4	4.0%



	53-62	1	1.0%
Environmental Awareness	1	0	0.0%
	2	0	0.0%
	3	21	21.2%
	4	27	27.3%
	5	51	51.5%
Total		99	100%

(Source : Primary Data)

Gender

Based on the data obtained, visitors to Bale Mangrove Ecotourism are dominated by women, as many as 63 people, or around 63.6%, compared to men, as many as 36 people, or around 36.4%.

Education

The length of schooling of respondents measures the education of visitors to Bale Mangrove Ecotourism. The majority of respondents (63.6%) possessed a high school education (12 years), while (21.2%) had completed junior high school (9 years). Next were tourists who took 16 years of education or the equivalent of S1, namely 13 people or around 13.1%. The least were those who had taken 6 years of education or the equivalent of elementary school, namely two people or around 2.0%.

Income

The income data in this sample is categorized into monthly ranges. The majority of respondents, approximately 93.9%, fall within the income range of IDR.0 to IDR.2,000,000. A smaller portion, around 4% (4 individuals), has an income between IDR.2,100,000 and IDR.5,000,000. Higher income ranges, such as IDR.5,100,000 to IDR.7,500,000 and IDR.7,600,000 to IDR.10,000,000, account for even smaller percentages, with each range representing only 1 individual or 1% of the total sample.

Age

The majority of visitors to Bale Mangrove Ecotourism are young tourists aged 13 to 22 years, comprising 76 individuals or approximately 76.8% of the total. The second-largest group consists of tourists aged 23 to 32 years, totaling 14 individuals or about 14.1%. Tourists aged 33 to 42 years and 43 to 52 years each account for 4 individuals or roughly 4.0%. Meanwhile, the smallest group includes visitors aged 53 to 62 years, with just 1 person, representing around 1% of the total

Environmental Awareness

Data analysis shows that most respondents have high environmental awareness, reaching 78.8% (very concerned 51.5% and concerned 27.3%). This indicates that most respondents

understand the importance of protecting the environment and are committed to environmentally friendly practices. However, there is also a segment of respondents with a moderate level of environmental awareness (25.3%), indicating variation in the level of understanding and action regarding environmental issues among respondents.

Table 2. Respondent Willingness to Pay

Willingness to Pay	Yes	79	79.8%
	No	20	20.2%
WTP (IDR)	0-5000	20	20.2%
	6000-10000	71	71.7%
	11000-15000	6	6.1%
	16000-20000	1	1.0%
	>25000	1	1.0%
Total		99	100%

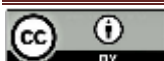
(Source : Primary Data)

WTP

The survey results show that most respondents, or as many as 79 people or around 79.8%, expressed willingness to pay additional fees if the funds were allocated directly to the maintenance and conservation of mangrove ecosystems in Bale Mangrove Ecotourism. In comparison as many as 20 people or around 20.2% of respondents thought that the entrance fee should be maintained at the current level. However, 20 people or around 20.2% of respondents, were also willing to pay at the current rate of IDR.5,000. A total of 6 people, or around 6.1% of respondents, expressed willingness to pay higher, namely in the range of IDR.11,000 to IDR.15,000. Meanwhile, only a few respondents (1 person each with a percentage of 1.0%) were willing to pay in the range of IDR.16000 to IDR.20000 or above IDR.25000.

Table 3. Respondent Expense For Tourism and Percentage to Mangrove

Expense For Tourism	0-50000	9	9.13%
	51000-100000	30	30.3%
	101000-300000	44	44.4%
	400000-600000	13	13.1%
	750000-3000000	3	3.0%
Percentage To	0%-25%	30	30%
	26%-50%	36	36%



Mangrove	51%-75%	25	25%
	76%-100%	8	8%
Total		99	100%

(Source : Primary Data)

Expense For Tourism

Respondents' expenditure data is based on monthly income ranges. The majority of respondents, as many as 44 people or around 44.4%, allocated between IDR.101000 to IDR.300000 for tourism activities. A total of 30 respondents, or around 30.3% of respondents, allocated between IDR.51.000 to IDR.100.000. The remaining 13.1% allocated IDR.400.000 to IDR.600.000, and as many as nine people, or around 9.1% of respondents, allocated less than IDR.50.000, while three people, or around 3% of

respondents, allocated more than IDR.750.000.

Percentage to Mangrove

This data shows the proportion of respondents' expenditure allocated for visits to Bale Mangrove Ecotourism. A total of 36 people, or around 36% of respondents, allocated 26-50% of their total travel expenditure for visits to Bale Mangrove Ecotourism, then as many as 30 people or around 30% of respondents allocated 0-25% of their total spending for visits to Bale Mangrove Ecotourism, and as many as 25 respondents or around 25% allocated 51-75% of their total travel expenditure for visits to Mangrove Ecotourism. At the same time, only eight people or 8% of respondents allocated more than 75% of their total travel expenditure for visits to Bale Mangrove Ecotourism

Table 4. Regression Result

Variabel	Coefficient	t-statistic	P Value
Total Cost Travelling	.0239846	2.14	0.035
Income	.000022	0.04	0.965
Expense For Tourism	.001754	0.92	0.358
Education	29.65167	0.18	0.856
Distance	-12.33357	-0.86	0.392
Dependant	381.2922	1.58	0.118
Awareness	1033.888	2.60	0.011
Age	32.97146	0.81	0.420
_Cons	134.9751	0.05	0.958
F-Statistic			2.70
R-Squared			0.1937

(Source : Processed Data)

DISCUSSION

Total Cost Traveling

This variable has a positive coefficient, meaning that the higher the costs incurred for travelling, especially mangrove tourism, the more money will be spent to protect the conservation of Bale Mangrove Ecotourism. The value of this variable is (0.035), which is below the significant threshold (0.05) this indicates that this variable has a significant effect on the dependent variable. The results of this regression support the findings of previous research, which was conducted (Wardani et al., 2021), which says that the transportation cost variable significantly affects the number of visits and will certainly affect the costs incurred for conservation.

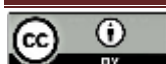
Income

This variable has a positive coefficient, which means that the higher the income of visitors, the more likely it is that money will be spent on ecotourism conservation costs. An increase in income is directly proportional to the rise in

willingness to pay for a healthy environment. Higher income provides more extraordinary financial ability to pay for a better quality of life, including a clean and sustainable environment (Nwofoke et al., 2017). The value of the income variable is (0.965) which is greater than the significant threshold (0.05) therefore, the income variable can be considered insignificant to the dependent variable, this opinion is supported by research conducted by (Noviati Sadikin et al., 2017) which says that income has no significant effect on willingness to pay.

Expense for Tourism

This variable has a positive coefficient, which means that the higher the cost spent on tourism, the more likely it is that money will be spent on ecotourism conservation costs for Bale Mangrove Ecotourism. The value of the variable cost for tourism is (0.358) greater than the significant threshold (0.05), therefore the variable cost for tourism can be considered to have no significant effect on the dependent variable.



Education

This variable has a positive coefficient, A positive correlation exists between educational attainment and the willingness to pay for ecotourism conservation. Nevertheless, the impact of the education variable on the dependent variable is not statistically significant at the 0.05 level because the value is (0.856). This opinion is supported by research conducted by (Wardani et al., 2021) which states that the education variable was found to be statistically insignificant in predicting the number of visits but significantly influences conservation costs. This differs from the study carried out by (Fikri & Rahmini, 2020), which explains that the education level variable has a positive and significant effect on willingness to pay.

Distance

This variable has a negative coefficient, meaning that the further the distance of the visitor's residence to the mangrove location, the less likely it will affect the amount of money for mangrove conservation WTP. The value of the variable distance of visitors' residence is (0.856) greater than the significant threshold (0.05). Consequently, this distance variable can be regarded as having no substantial impact on the dependent variable. This opinion about the distance variable is supported by research conducted by (Julianti & Sri Wulandari, 2022), which states that distance has an essential relationship with participants' willingness to pay contributions.

Dependant

This variable has a positive coefficient, which means that the more family dependents of the respondents, the more likely it is that money will be spent on the conservation of Bale Mangrove Ecotourism. The value of the family dependents variable is (0.118) greater than the significant threshold (0.05). As a result, the family variable appears to have no notable influence on the dependent variable. This assertion is backed by research conducted by (Ika Berliana et al., 2024), which states that the number of dependents is unrelated to the willingness to pay more for environmental services

Awareness

This variable has a positive coefficient, meaning that positive relationship exists between public awareness of mangrove importance and the willingness to pay for ecotourism conservation. The value of this variable is (0.011), which is less than the significant threshold (0.05). This indicates that the awareness level variable

significantly affects the dependent variable. The research is supported by (Purnama et al., 2023) with the finding that respondents' willingness to pay has a strong positive correlation with their awareness of the importance of mangrove conservation.

Age

This variable has a positive coefficient, A positive correlation exists between age and the willingness to pay for ecotourism conservation. Nevertheless, the impact of the age variable on the dependent variable is not statistically significant at the 0.05 level because the value is (0.420) this indicates the age of the respondents can be considered have no significant effect on the dependent variabel. This opinion is supported by (Gumilar, 2019), who states that the age variable has no significant effect on willingness to pay.

The economic value of ecotourism activities at Ecotourism Bale Mangrove by using a method of travel cost (travel cost) is as follows:

$$\begin{aligned} \text{Total Value} &= \frac{\text{Average Value} \times \text{Population}}{1000} \\ &= \frac{180.000 \times 62.276}{1000} \\ &= \frac{11.209.680.000}{1000} \\ &= 11.209.680 \end{aligned}$$

Information:

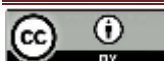
Average value = The costs to transport the maximum

The population = Population of Jerowaru, East Lombok

Based on the calculation obtained, the economic value of Ecotourism Bale Mangrove with 1000 visits is IDR 11,209,680 (711,74 USD) with the average willingness to pay by IDR 8,595 (0,55 USD)/visit.

A greater willingness to pay for mangrove ecotourism can boost economic growth, generate employment opportunities, enhance local living standards, and safeguard crucial ecosystems. By comprehending the factors affecting WTP, policymakers, locals community and tourism stakeholders are encouraging a better strategies to optimize the economic and ecological advantages of mangrove ecotourism.

Bale Mangrove Ecotourism currently charges an entrance fee of IDR 5,000 (0,32 USD) per person. However, our research found that visitors are willing to pay up to IDR 8,595 (0,54 USD) per visit. Based on these findings, we recommend increasing the fee to IDR 7,500 (0,47 USD). This increase will benefit the local community by generating more income and will also support



improved mangrove conservation. Overall, this policy change will have a positive impact on sustainable development.

CONCLUSION

The study aims to determine the factors influencing the amount visitors are willing to spend for mangrove conservation. This study found that the recreational value of Bale Mangrove Ecotourism, as measured by Willingness to Pay (WTP) using the Travel Cost Method (TCM), was IDR 11,209,680 (711,74 USD)/1000 visit, and the average willingness to pay was IDR 8,595 (0,55 USD)/visit. Based on the results of statistical regressions that have been carried out, it is found that the total cost of traveling and awareness of visitors have positive coefficients and a significant effect on the willingness to pay for mangrove conservation. The other factors, income, expense for tourism, education, dependent, and age, have positive coefficients but no significant effect on WTP for mangrove conservation. Conversely distance has a negative coefficient and no significant effect on WTP.

For future research, it recommends that the future studies can contribute to a more comprehensive understanding of the factors influencing visitor WTP. Moreover, it is essential for the next researchers to conduct a comprehensive Focus Group Discussion with related stakeholders to develop evidence-based strategies to promote sustainable mangrove conservation and ecotourism.

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